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Combat Crew

strategic air command

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Combat Crew

Magazine of the Strategic Air Command - 30th Year of Publication

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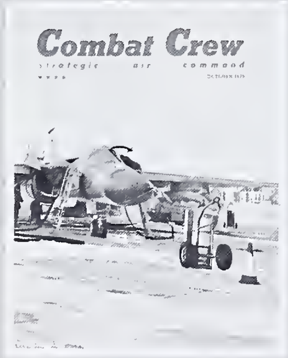
IN THIS ISSUE

Big Snow 4
Aircraft Icing 8
Too Close for Comfort 10
R & D Corner 12
Invisible Equipment 16
Titan II Crew Duty 18
Ace Topics 20
Big Instrument 26



ON OUR COVER

Winter season is fast approaching and with it all SAC crews will be concentrating on cold weather procedures. For more see article on pages 4, 8 and 30.

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COMBAT CREW is an internal publication of the Strategic Air Command with the sole purpose of promoting safety. The contents of this magazine are informative and not to be considered as directive in nature. Facts, testimony and conclusions of all mishaps printed herein may not be construed as incrimination under Article 31 of the Uniform Code of Military Justice. All names, dates and places used in conjunction with mishap stories are fictitous. Written permission must be obtained from Headquarters, Strategic Air Command, before any material may be reprinted by other than U.S. Air Force organizations. Use of funds for printing this publication has been approved by Hq. USAF, Distribution FX, controlled by IGFC. SAC units submit distribution requests through local PDO.

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FLARE

On December 17, 1903, at an isolated beach on the Outer Banks of North Carolina, a man flew. This achievement severed the fetters which had bound man to the earth throughout his existence. An age old dream to fly was realized. The imagination and technology that we have seen applied to the concept of flight in the 76 years since that time are enough to create awe and bewilderment in us all. Since that journey began in 1903, we have inherited a plethora of wondrous flying machines. Triumph and tragedy have marked the journey from that fragile craft in 1903 to the giant passenger and military planes and the Saturn rocket of today; it has taken us from an isolated beach to the moon and beyond in less than a person's lifetime.

The United States Air Force is a child conceived from man's passion for flight. The military application of flight was not long in coming and being accepted as an indispensable element in this nation's national defense effort. Its tactical and strategic usefulness could not be denied. With the advent of nuclear-equipped long range aviation and ballistic missile capabilities, and a drastically changed arrangement of international relations, the concept of strategic deterrence took on ominous importance. For more than 30 years, we in Strategic Air Command have served as this country's primary deterrent force.

This Command's legacy has been one of proven combat capability and a peacetime state of readiness constantly honed to a razor sharp edge. Our people number nearly 130,000, serving at bases throughout the world. We are the nation's primary nuclear punch, with well over 2,000 bombers, tankers, and ICBMs in our custody. The related equipment and facilities required to support SAC's worldwide operations constitute a sizeable portion of our total national defense inventory. In sum, we are thousands of people doing hundreds of jobs with billions of dollars worth of equipment, keeping the nuclear powder dry, for the common cause of peace. We know our mission, we know our jobs, and we play second fiddle to none when the cards are down. No one disputes our combat capability and readiness.

But in the day to day world of peaceful pursuits, which is what we are around to protect, I would postulate that our single most significant task is to protect us from ourselves. We are part of a proud and colorful tradition established since that December day in 1903, but as the song goes "The times they are a-changin' . . ." constantly. What we did in the past or may be called upon to do in wartime cannot be equated with peacetime requirements. A

KEYSTONE TO READINESS

Brig Gen James E. Light, Jr.
DCS/Logistics

prime measurement of our individual maturity and collective professionalism is how carefully and safely we manage our private and public lives and resources. Safety in day-to-day operations is the keystone to readiness in our business.

Safety is an attitude, a personal frame of reference, a business of the mind. It speaks directly to the human condition. It is easy for people at all echelons in an organization as large as ours to develop the feeling that what an individual does is of little or no consequence. Safety, in this case, doesn't always apply to each person. But we all know that this couldn't be further from the truth. Our records are replete with incidents and statistics which prove otherwise. One person's attitude and actions are usually the springboard for exemplary performance or problems, some of which assume catastrophic proportions. Safety is not someone else's business; it is ours. Whether one is on or off duty, a commander or a file clerk, a crewmember or a maintenance man, working with equipment or people, on the ground or in the air, transporting nuclear weapons or driving a car, making precise calibrations or mowing grass, the business of thinking and doing things safely includes us all as corporate members. Although many programs and plans exist, no all prevailing system can be constructed or depended upon to prevent mishaps and take the burden from our shoulders. The cloak of safety is ours to wear and maintain throughout our lives.

There are several key factors which make this cloak of safety easier to wear. One of these is awareness. We must constantly be attuned to what is happening around us and the possible consequences. People change. Conditions change. Expectations change. Equipment is constantly modified and modernized. Remind yourself and those around you of the deadly effects of boredom, carelessness, and fatigue. The more aware and mentally alert you are, the safer you are.

Another factor is time, time devoted to thinking about and improving matters pertaining to safety. All of us have too many demands on our time and none of us have crystal balls to see precisely what is needed where. But surprisingly enough, a little time away from what you are routinely doing devoted to thinking and looking at safety matters does quite frequently produce crystal ball effects. Hazards are eliminated, unsafe practices are corrected, compliance with procedures is insured, faulty equipment is repaired, and awareness is increased.

A third factor is personal discipline, not an enforced fear but an individual commitment. Accidents and mishaps are caused either by unsafe conditions or practices. Very few of them stem directly from unexpected material failure. I will not use this as a forum to recite a long list of examples. Our record, unfortunately, too often doesn't need any more publicity. Two cases in point will suffice. We

Continued on Page 19

Capt Jim Evans
410 BMW, K. I. Sawyer AFB

Casey in the Land of the big SNOW

So this is your first winter at Sawyer?

Don't worry! Those stories you heard about the weather here are only half true. However, one story that is true concerns the K. I. Weather Rock. It is used by our inscrutable forecasters to discern the seasons of the year. When the rock has four *inches* of snow on it, it's summer; when the rock has four *feet* of snow on it, winter is approaching.

The unique location and adverse weather of Sawyer make this a demanding place to earn your flight pay. By planning ahead, knowing your limitations, and understanding the capabilities of your trusty silver steed you, too, can finish out several winters here and look forward to moving southward.

Preparation for a safe flight begins even before mission planning day. Use your time on alert to become thoroughly familiar with the KC-135 aircraft systems, normal and emergency procedures, and especially cold weather operating procedures. You will certainly get ample opportunity to use the knowledge. As winter approaches and the temperatures get colder and the snow gets deeper, the airplane will begin to develop new and somewhat disconcerting habit patterns. The attached Cold Weather Malfunction Analysis Chart can give you some hints about these undesirable habits and how you can show Casey you know his tricks and cannot be so easily fooled.

The day before the flight you should have four uninterrupted hours to accomplish your mission planning. Sure, I know you can get the required paperwork done in a lot less time than that, but mission planning is more than the completion of required forms and cursory briefings. Take time to review, in the light of forecast weather conditions, what you may anticipate in maintenance problems, taxiway and runway conditions, necessary takeoff data and other performance data recomputations, and the various things that make you yearn for dry runways and clear skies of summer. Prior planning may help you avoid an unpleasant surprise.

Good morning, champ, are you ready to go fly today? Drat, where did all that snow come from? Can you clear the driveway, start the car, and make it to the squadron in 25 minutes through a foot and a half of snow to make your 0455 bus time? It is a hard thing to do, but the unpredictability of winter driving conditions makes it wise to sacrifice a little bit of beauty sleep to insure that you are able to make it to your bus on time. Minor annoyances like shoveling the driveway and a car that refuses to start can get you behind the power curve and slippery driving conditions make it downright dangerous to be in a hurry. Getting to the squadron late for your bus time is no solution, either. You will find that it is even harder to make up lost time at base operations or at the aircraft when the snow is swirling around your head and piling up on the ground. Rushing through preflight checks or takeoff data computations can be an open invitation to costly errors and even to disaster.

It is nice and warm in base operations. After the takeoff data has been redone, the final premission briefing given and the NOTAMS checked, it is very tempting to savor that warmth . . . Resist this temptation! Try to arrive at the airplane at least one hour prior to scheduled engine start. If all goes well, you can have that cup of coffee at the aircraft after preflight, but you cannot back up time when you have to work your preflight checks around snow removal, de-icing or maintenance problems. Winter is full of surprises.

Preflight is completed and the engines all started normally. Maybe you can relax, right? Wrong. Taxiing on ice is a subtle art that separates the pilot from the throttle bender and brake smoker. Nose gear steering is fast and very responsive on dry pavement, but on ice you can easily end up skipping the nose tires sideways across ramps and taxiways. Brakes, too, lose much of their authority. You have to plan well ahead of the airplane and keep taxi speeds well under control to get to the runway safely. Cold temperatures will cause the airplane to taxi quite fast, even at idle power. Keep your taxi speeds slow, you may not be able to stop or turn as quickly as you may think you can.

During ground operations, remember that icing can occur even with the anti-ice on when it is snowing. Make periodic engine runups to prevent ice accumulations during ground delays and make a final runup just prior to takeoff. It can save you from a very unpleasant discovery as your engines become ice crushers on takeoff roll.

Takeoff time has arrived and the RCR is reported as "loose snow on the runway/ice on the runway/RCR 17/patchy" (LSR/IR 17P). On slick runways, taxi gingerly onto the runway, insure that the nose wheel is straight and be quite certain that everything is set before you open 'er up for takeoff. Be very conscious of the approach and unstick winds, too. The airplane tends to weathervane and there is very little the nose gear steering can do about this tendency when the runway surface is slick — this makes full use of rudder absolutely vital for good directional control.

With the cold temperatures we have at northern bases, old Casey can move right out. Watch those operating limits, particularly the speed limitations on the flaps. Cold temperatures mean more thrust available. The flaps are still hanging on the same brackets as always and would like to continue to do so.

Climb, cruise and descent must also be planned with the possibility of icing occurring.

If you have plenty of time to relax during the nav leg, you could be in for a big shock when you get back to the traffic pattern. Sure, I know you got a weather briefing at base operations. Let's consider for a minute how long ago that was . . . three hours, maybe four, or even more. Because of close proximity to Lake Superior, a champion weathermaker, the weather at K. I Sawyer is extremely unpredictable. A wind shift of only 20 or 30 degrees can cause the snowfall accumulation of a storm to increase fourfold. The best weather forecast I ever got was for snowfall to total "one to four" — that's one inch to four feet! He was right. Keep updating your weather, after air refueling and on the nav leg. If the forecaster is going to change his story, you should be the first to know about it.

Descent and landing through K. I. Sawyer weather is an excellent opportunity to practice precise flying and good crew coordination. Both can save your marbles from getting scattered in a tight situation.

Down south you can probably get away with landing long and hot. When you are halfway to the north pole, though, you don't have that luxury. Every extra knot over the threshold will have to be dissipated somewhere and every extra foot you touch down beyond the normal point is that much less time and distance in which to rid yourself of that excess speed. Cutting the inboard engines after raising the speed brakes can decrease landing roll somewhat. Much more effective, though, is to cross the threshold on-speed and touchdown about 1,000 to 1,500 feet down the runway. If you cannot do both and the runway is snow-covered or icy, start thinking about taking it around and trying again. It is much less embarrassing than coming to a stop in or beyond the overrun.

What about crew coordination during winter operations? The navigator should back you up on altitudes, provide drift and ground speed information on final approach, and remind you of approach restrictions or missed approach instructions. The copilot can either fly the approach to MDA/DH or actively monitor the pilots' actions. The ballgame does not end at approach minimums, however. Once the field is in sight and the decision is made to land, the copilot should remain on the gauges to warn of any deviations from desired airspeed, glide slope or descent rate. As a suggestion, the copilot should sing out if airspeed departs from desired by more than 10 knots, glide slope by one dot or more, and if the descent rate exceeds 800 fpm below decision height. Radio altimeter call-outs at 100 feet, 50 feet and at 10-foot increments from there to touchdown may be helpful too. It can save you the embarrassment of flaring below ground level when the runway environment becomes obscured by snow cover.

Centerline and touchdown zone markings are white, you know, and will disappear quite easily under even a thin accumulation of snow. Learn the flare cues and visual references that can be provided by runway lighting to be able to make a safe touchdown and maintain runway centerline without the benefit of a painted guideline. Practice it once in a while when the weather is good, but be sure to warn your copilot. Knowing the flare picture and being able to stay on centerline with only the runway lights can come in very handy.

Well, champ, you made it. A nice landing in a blinding snow storm, safely back to parking and the engines are all shut down. Now you collect your gear, climb down the ladder and . . . OOPS . . . you just fell flat on your back on the ice. Oh, well, nobody's perfect, right?

Get some cross-country skis or a snowmobile, read section IX of the flight manual frequently, and have a safe stay at K. I. Sawyer. You'll love it!

EDITOR's NOTE — Capt Evans, was a former flying Safety Officer with the 410 BMW, K. I. Sawyer AFB and served over five years there. He is now assigned to the 22 AREFS, March AFB.

KC-135 MALFUNCTION ANALYSIS CHART
COLD WEATHER PROBLEMS

The following is an experience guide to cold weather problems, their probable causes and flight crew corrective actions which have proven effective in the past. It can be used as a guide only, not as justification for accepting a bad aircraft or violating existing tech data.

FLIGHT CONTROLS AND TRIM

INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
Aileron trim frozen or very stiff	Cold effect on aileron trim drum.	Apply BT400 duct directly to aileron trim drum in lower nose compartment for 10 to 15 minutes.
Flight controls stiff	Some increase is normal due to low cable tensions/ cold oil (-1, 9-19).	If excessive, call maintenance.
Rudder power, Low hydraulic pressure	Before starting; Aux pumps unable to produce enough cold/dense fluid. After starting: cold/dense fluid.	Motor engine. If problems persist, depressurize right system and check preload in accumulator. Cycle rudder through full deflection several times and re-check.

ELECTRONICS

INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
ARC-34 UHF radio cycles continuously	Less than 15 min. not warmed up.	After 15 minutes, turn OFF and back ON. Still cycling, select other mode (MANUAL/PRESET). Still cycling, call radio maintenance.

HF Radio.	Above freezing Below freezing	15 minute warmup required. 20 minute warmup required.
APN-59 radar	Below 0°F	15 minute warmup required.
Generators	Below +20°F	5 minute warmup after engine start before closing generator breaker switch.

HYDRAULICS

Aux pumps fail pressurize system	Cavitation of pumps/cold fluid.	Motor or start engine on affected side.
Low pressure/no pressure	Loss of preload to accumulator.	Depressurize and check preload.
Loss of quantity after engine start (below 3 gallons)	Unknown. Does not necessarily mean leakage.	Shutdown engines on affected side and re-service with fluid.
Hydraulic leak from engine oil cooler	Frozen check valve	Engine anti-icing on and 80% rpm for one minute. Wipe down and re-check.
Rudder power, low hydraulic pressure	See flight controls.	

ENGINE STARTING PROBLEMS

No rotation	Bad air cart	Try another air cart/engine.
	Frozen starter control valve	BT-400 heater duct on valve for five minutes. Start remaining engines while waiting for problem engine.
	Frozen bleed air (strut) valve	Actuate engine bleed switch several times. Not corrected, have valve replaced.
	Starter failure	Replace starter.
No ignition	Frozen fuel control unit	BT-400 heater duct to fuel control for five to ten minutes. Meanwhile check engine igniters.
RPM hangs at 35-40% RPM	Frozen fuel control or PT-4	BT-400 heater duct to fuel control for five to ten minutes.
Torch/surge/overtemp/ start Compressor stall	Frozen fuel control	BT-400 heater duct to fuel control for five to ten minutes.
Slow start	Cold-soaked engine	Expect full two minutes from initiation to IDLE. Idle for two minutes at -22°F or below before advancing throttles.

*If first attempt is unsuccessful and no maintenance is performed, the odds are heavily against a second start being successful. Be aware there will be a ten minute wait after a second start attempt.

GENERAL AIRCRAFT

APU normal/no power to starter of APU	APU port mircoswitch frozen	Positive actuation of doors to free switch plunger
Boom erratic when flown after T.O.	Ice on ruddervator arm	Fly boom through UP/DOWN and LEFT/RIGHT cycles. Should then fly smoothly.
Crew entry door will not latch	Frozen seal or ice blocking pressure	BT-400 duct directly on pressure plate for five minutes. Re-check pressure plate for proper operation.

AIRCRAFT ICING *a major weather hazard*

Capt Chuck Mortensen
2d ACCS, Offutt AFB

During the winter season, our aircrews are subject to many additional hazards to flight that are not always present year round. One of these major weather problems is aircraft icing. Its formation can dangerously distort airfoil shapes, add drag and weight, and induce structural vibration. Other hazards are loss of visibility from windshield ice, impaired operation of control surfaces, and possible false indications by flight instruments due to ice in the pitot static system. Off course some of these effects are extreme, but many of the problems with icing are reduced lift, possibly decreasing thrust (due to the use of anti-icing equipment), and increasing drag. Icing is difficult to forecast, and under what appears to be identical situations, the icing intensity can vary considerably.

There are only two fundamental requirements for structural ice formation on aircraft. First, the aircraft must be flying through visible water in the form of rain or cloud droplets, and second, when the liquid droplets strike, their temperature or the temperature of the aircraft surface, must be 0° C or below. The types of structural icing as identified in various weather manuals are clear, rime, or mixed (clear and rime).

CLEAR ICE

Clear ice forms when, after initial impact, the remaining liquid portion of the drop flows out over the aircraft surface gradually freezing as a smooth sheet of solid ice. This type of icing forms when drops are large as in rain or in cumuliform clouds. Clear icing is hard, heavy, and transparent or translucent in appearance. Its removal by deicing equipment is difficult.

RIME ICE

Rime ice forms when drops are small, such as those in low stratified clouds or light drizzle. The liquid portion remaining after initial impact freezes rapidly before the drop has time to spread over the aircraft surface. The small frozen droplets trap air between themselves giving the white milky or opaque appearance, with granular deposits which accumulate on the leading edges of the airplane. It generally shows little or no tendency to adhere to the contour of an airfoil outside of a limited area near the center of the leading edge. Rime ice is lighter in weight than clear ice and its weight is of little significance. However, its irregular shape and rough surface make it very effective in decreasing aerodynamic efficiency of airfoils, thus reducing lift and increasing drag. Rime ice is brittle and more easily removed than is clear ice.

MIXED ICE

Mixed ice forms when drops vary in size or when liquid drops are intermingled with snow or ice particles. It can form rapidly with particles becoming imbedded in clear ice, building a very rough accumulation sometimes in a mushroom shape. Icing accumulates at different rates depending on the environment you are flying in. The heaviest icing usually occurs in the temperature range of 0 to -10° C. At these temperatures if the water in the clouds becomes supercooled, i.e., at temperatures below freezing, it is in a very unstable state; and if it is disturbed it will rapidly change to ice. When an aircraft strikes a supercooled drop, part of the drop freezes instantaneously. The latent heat of fusion released by the freezing raises the temperature of the remaining portion to the melting point. Then the aerodynamic effects may cause the remaining portions of the drop to freeze. The way in which the remaining portion freezes determines the type of icing you pick up. Aircraft icing intensities are standardized in categories of trace, light, moderate, and severe; refer to the IFR supplement if you need to determine the intensity. Icing is highly unlikely at temperatures below -40° C.

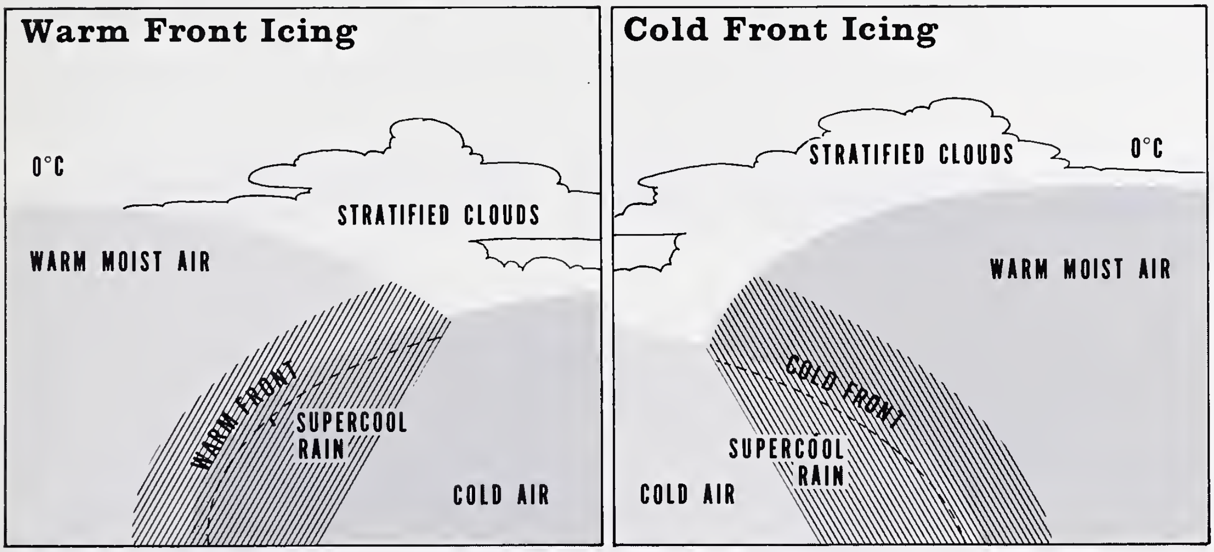


Figure 1

Different cloud types can produce different types of icing, and all clouds at subfreezing temperatures have icing potential. Small water droplets occur most often in fog and low level stratus clouds. Drizzle or very light rain is evidence of the presence of small drops in such clouds with the most common type of icing found there being rime ice. Thick extensive stratified clouds that produce continuous rain such as altostratus and nimbostratus usually have relatively large drops and greater liquid quantities. Such cloud systems in winter may cover thousands of square miles and present serious icing conditions over a long period of time. The heaviest icing usually will be found at or slightly above the freezing level where temperatures are never more than a few degrees below freezing. In layer type clouds, continuous icing conditions are rarely found more than 5000 feet above the freezing level, and usually only two or three thousand feet thick.

Figure 1 depicts cold and warm front conditions which are favorable to rapid accumulation of clear ice from freezing rain below a frontal surface. Rain forms above the frontal surface at temperatures warmer than freezing. As the rain falls through the air at temperatures below freezing it becomes supercooled. The supercooled drops freeze on impact with an aircraft surface, and in these clouds the intensity may become critical because of the large amount of supercooled water. Icing can also become serious in cumulonimbus clouds along a surface cold front or along a squall line. Crews have little contact with this type of ice because they practice radar avoidance in these areas of precipitation.

OTHER PROBLEMS

Another type of icing which can occur to aircraft such as the A-10 or T-38 is induction icing. The "old heads" who flew the recips knew it as carburetor icing. This type of icing can occur in clear air (no visible water). The cause seems to be the dynamic action at the engine air intake which restricts airflow as it builds and eventually causes the engine to overheat.

As far as wing icing is concerned, frost doesn't change the basic aerodynamic shape of the wing, but the roughness of its surface spoils the smooth flow of air and causes a slowing of the airflow. This slowing of the air causes early air flow separation over the affected airfoil, resulting in a loss of lift. A heavy coat of hard frost will cause a 5 to 10 percent increase in stall speed. Frost formation in flight is comparatively rare but possible. It is formed when the aircraft very quickly flies from a region where the temperature is well below 0° C to a region where the temperature is considerably higher and where the humidity is high. Then frost may form when the moisture in the warm air is chilled suddenly below freezing by contact with the cold surface of the aircraft.

Frost buildup while flying is unusual, however, frost on parked aircraft is a more familiar sight especially at northern bases. This frost if not removed can present a problem to the pilot during takeoff roll. A large buildup of frost on the aircraft can mean a takeoff much longer than originally planned.

Aircrew coordination with the weather forecaster can give the crew good information on where icing can be expected and where to go to avoid it.

Ed Note: Information about icing can be found in various weather manuals. This article borrows from some of this data and is intended to be a review of the factors involved with aircraft icing.

Too Close for Comfort

Capt Bob Boswell
71 AREFS, Barksdale AFB

Winston Churchill once said, "There is nothing in life more exhilarating than being shot at without effect." It may not be as exhilarating, but just barely escaping a major aircraft mishap comes very close. I would like to tell you about one such close call that happened to me not too long ago.

The story, and the overall situation provide food for thought, and raise some questions about priorities and pressures that we encounter in our day to day business of keeping the peace. I'm sure the tale will remind each of you of similar situations you may have encountered.

Like most southern winter afternoons, the sky was covered with a soft blanket of clouds. Although it hadn't rained, there was a heavy feeling in the air and a slight moist layer on the ramp surface. Everyone and everything moved in a slow, positive manner. The winter doldrums were setting in. At the alert facility the crews were attending another required ground training class.

Suddenly, the loudspeaker blurted, "For the alert force, KLAXON, KLAXON, KLAXON," punctuated by the actual sound of the klaxon going off. Instantly, the crews dashed to the fast ride vehicles, pulses quickened and adrenaline flowed as they raced towards their aircraft. In the back of everyone's mind was an item emphasized in the morning briefing. "We've got to accelerate our response and cut our reaction time to the absolute minimum." Racing against the clock, the crews boarded their aircraft and started engines. As emergency equipment was donned, the command post message was copied and checked. It's a mover! Power up, get her rolling. Let's fill the gap. The entire alert force of bombers and tankers was streaming toward the runway. Then it happened.

The lead aircraft was moving too fast to make the turn onto the active and the pilot hit the binders — hard! Smoke curled from the overloaded brakes. That smoke was the only immediate indication of a potential impending disaster. Seeing the smoke, I yanked off power, applied brakes and raised my speedbrakes in an attempt to signal the following aircraft that the taxi stream was slowing. The pilot behind me got the message all right and applied full braking but realized at the same time that he would be unable to stop in time to prevent a collision with my aircraft. Since we were still on the hammerhead he had some room to maneuver left. He swerved and passed to my left. I held my breath as his aircraft filled my window. His wingtip flashed by just inches away from mine.

Talk about luck! Someone was with us on that one. It wasn't until sometime later that we got to talking about what happened and realized just how close we had come to being statistics. As everyone knows, and as history shows, a collision between two heavy fuel-laden aircraft is disastrous.

That's the story. Now, why did the close call ever happen at all? Why did the lead aircraft get into a position that required maximum braking? What would have happened it I hadn't raised my speedbrakes or if the following aircraft hadn't properly interpreted my signal?

The second question must be answered to get to the answer of the first question; the third can be discussed separately.

One doesn't have to be around very long to become aware of the importance of quick response to the credibility of the manned aircraft portion of the Triad. Remember the first time someone put a stopwatch on you to see how long it took to get up the ladder, start engines, and get the aircraft in "ready to taxi" configuration? Do you remember a speech that went something like this? "True, it's probably going to be an exercise but you cannot be sure. You must assume that it's the real thing when the klaxon sounds."

For the SAC combat crewmember, this indoctrination starts at Castle and becomes one of the constants in his or her life from then on. Being human, there is sometimes a tendency for the alert crews to get a little relaxed in their response. When this happens you can bet someone will bring the subject up — especially if an inspection is just around the corner. Such a pep talk was held on the morning of this exercise. It's not difficult to see why the lead aircraft commander may have been in too great a rush to get on to the runway. Understandable — Yes. Necessary? No. By the time the lead aircraft got to the runway, the crew would have known they were responding to an exercise message. At that point, it would have been appropriate to take a deep breath, ease off some power, and begin to gently brake, if required. Such a technique would tend to make the chain reaction of slowing/braking by following aircraft less violent, and the overall operation just a little bit safer. What's to gain? The prevention of needless loss of personnel and material resources.

Now, for the last question. The use of raised speedbrakes to indicate reduction of thrust and application of brakes seems to be a good technique because the third aircraft in the preceding story certainly got the message. One of the old heads around here said "Yeah, that's a great technique. It was SOP at Base X." I'm sure the pros and cons can be argued at great length; but the most important thing is to talk about such things. Discuss this item at hangar flying sessions or when you're sitting around the alert facility chewing the fat. If you like the idea and plan to use it, get the word out so everybody knows.

What I've said boils down to just a few thoughts. There are definite priorities in our business and there certainly are pressures. Accept them. Think about them. That's the key. Think safe and survive.

r&d corner

HQ/SAC — DIRECTORATE OF AERONAUTICAL REQUIREMENTS

WST

UPDATE

Capt John Clapp & Capt "Tex" Teixeira
Det 1, 4200 TES, Castle AFB, Ca

Think for a minute about the unthinkable — nuclear war. Think about the day or night that the Klaxon sounds and you are directed to launch. This time its not just an exercise, but the real thing. This thought has probably entered the mind of every SAC crew member who has pulled alert in the past 30 years. For every SAC crew member, the thought of nuclear war probably brings with it some feelings of fear or apprehension because this kind of all-out war is an unknown. Nevertheless, nuclear deterrence is the primary mission of the Strategic Air Command and its crews are well prepared. Hundreds of hours are spent practicing the professional skills required to accomplish the mission until these skills are honed to the razor's edge. Hundreds more hours are spent studying detailed Emergency War Order folders until the route, the targets, the threats, and the procedures are second nature. About the only thing that SAC crews could do to complete their preparation for the ultimate mission would be to actually fly their EWO route against the actual targets and threats. An impossible dream?

HQ SAC/XPHD is currently working with Air Force Systems Command/Aeronautical Systems Division (AFSC/ASD) and the Air Force Test and Evaluation Center (AFTEC) to acquire and test devices which will vastly improve the training of SAC aircrews for their EWO mission. This system is the B52/KC-135 Weapon System Trainer (WST). When deployed, the WST will permit SAC aircrews to practice their EWO mission without ever leaving home station.

The need for modern B-52G/H and KC-135 simulators to meet the future Office of Management and Budget and Office of Secretary of Defense goals of reducing flying time and thus training costs was identified in the June 74 Air Force Master Plan, Simulators for Aircrew Training. In addition, the energy crisis, the escalating costs of aircraft operations, and the need to extend the life of operational aircraft have necessitated the capital investment for modern simulator capabilities and subsequent expanded utilization. Also in 1974, SAC identified the requirement for modern B-52 and KC-135 simulators in combat crew and operational training programs. In 1975, a Program Management Directive was issued, officially directing the implementation of the WST program. For procurement of the WST, a two phase strategy based upon head-to-head competition was adopted. Phase I was designated the pilot production phase where each of two contractors would build a WST complex. After test and evaluation of each contractor's device and evaluation of their production proposals, a winner would be selected to enter Phase II. In May 1977, contracts for Phase I pilot production were awarded to the Boeing Wichita Company and to the Singer Company, Link Division. This competitive development of two pilot production units (PPU) will lead to the ultimate production of 12 B-52G, 6 B52H and 2 KC-135A Weapon System Trainers, one stand alone B-52G/H Offensive Station Mission Trainer (OSMT) and associated support equipment.

The main purpose of the WST is to prepare SAC aircrews for performance in combat. To this end the WST's will serve as a vehicle in support of initial combat crew training leading to the graduation of combat ready aircrews. In the field, the WSTs will provide a primary means of support for Mission

Qualification and Continuation Training to qualify and maintain aircrew proficiency in the tactical mission of the parent unit. Because segments of the EWO mission, such as penetration and weapons delivery, do not readily lend themselves to airborne rehearsal during peacetime, training in these segments must be accomplished on the ground. The WSTs have been designed to provide this capability.

The B-52/KC-135 WST will include simulation of all crew positions and be capable of worldwide flight over land and water, including the polar regions. Performance of the simulator will not be perceptably different from the aircraft and the system will simulate all motion, visual, and aural cues necessary to provide full training for SAC aircrews.

The B-52 WST is composed of the following major components:

1. A flight station mounted on a six degree freedom of motion base. The flight station will duplicate the aircraft flight deck and will include a visual subsystem that will provide the necessary cues for takeoff, approach and landing, and air refueling through the use of computer generated imagery techniques.

2. An offensive station mounted on a limited motion base capable of simulating low level flight characteristics. The offensive station will simulate all the BOMB/NAV systems and will include a Digital Radar Landmass Simulation (DRLMS) using a worldwide Defense Mapping Agency data base. Simulation of the B-52 Electro-Optical Viewing System will provide presentations of the low light level television, forward looking infra-red imagery along with the pilots' terrain avoidance presentations. Except for the PPU, all the WSTs will be delivered with the simulation of the new Offensive Avionics System (OAS) /ALCM.

3. A defensive station which will provide simulation of all on-board electronic warfare and fire control system displays and equipment. The system will simulate the ground and airborne threats required for realistic practice in combating and eliminating these threats.

4. Instructor consoles for each of the three stations which will provide remote instructor/evaluator monitoring and control capability. In addition, on-board instructor/evaluator positions for each crew station are provided to allow over-the-shoulder observation of crewmember performance. The instructional system is designed to provide automatic monitoring of student performance, automatic playback, automatic message transmission, and other features to minimize the task loading and difficulty for the instructor.

The KC-135 WST includes:

1. A flight station mounted on a six degree freedom of motion base and a visual subsystem for takeoff, approach and landing. In addition, limited boom operator provisions, to include seat, interphone, oxygen system, sextant mount, and circuit breaker panel, will be incorporated into the flight station.

2. A navigation station with simulation of all the KC-135 navigation systems plus DRLMS.

3. Two instructor consoles.

All the crew stations are physically separate compartments which will operate in one of the following three modes:

1. In the integrated mode all three B-52 crew stations (two in the KC-135) and associated hardware and software operate as a unit with the same interfaces between crew stations as exist in the aircraft. In this mode, the flight instructor console is capable of controlling the entire mission.

2. In the independent mode, each crew station operates as a separate training device. Each station is functionally independent but is provided with only a simplified simulation of all other interfaces between crew stations.

3. In the mixed mode (B-52 only) the flight and offensive stations perform as an integral and complete system similar to their operation in the integrated mode. In the mixed mode, the defensive station will operate and perform in the independent mode.

To insure that the WST meets SAC requirements, extensive testing is planned before and after delivery of the first device. Test and evaluation of the systems will seek to answer these four critical questions based on the program objectives in the PMD:

1. Do the WSTs provide from a life cycle standpoint, the best balance of cost, energy effectiveness, and logistics supportability?

2. Do the WSTs satisfy training objectives that cannot be presently satisfied by either the aircraft or the existing B-52 and KC-135 trainers?

3. Do the WSTs exhibit the required reliability, maintainability, and availability?

4. Do the WSTs provide realistic training which will allow the reassignment of events/sorties/hours from aircraft to the simulators?

The full answer to all of these questions may not be known until after delivery and follow-on testing. To provide at least a partial answer to the critical questions and to provide an assessment of the military worth of each B-52 and KC-135 WST, predelivery test and evaluation will encompass two phases: Phase I, preliminary evaluation and Phase II, post production award evaluation.

The Phase I evaluation will address the critical discriminators required for source selection and production award and will serve as a basis for future testing. This phase will include a limited Qualification Test and a limited Qualification Operational Test and Evaluation (QOT&E). The Phase II evaluation will include the completion of testing begun during Phase I, testing of any correction of deficiencies discovered during Phase I, and a conditional in-plant acceptance of the device. Following delivery of the PPU to Castle AFB in the fall of 1980, SAC will conduct a Follow-on Test and Evaluation to determine the answer to critical question 4. Because Phase I testing is currently the main emphasis area, it will be discussed for the remainder of this article.

Phase I testing will cover a simultaneous three month period (10 Sep 79 — 10 Dec 79) at each contractor's facility. To demonstrate design completion and compliance with system specifications, qualification testing will be conducted in three parts. The first part will consist of two weeks of flight/mission tests to assess WST performance and to identify specific areas for emphasis during engineering tests. Part two consists of four weeks of engineering tests, supported by aircrews, to assess performance aspects of the simulator and to test those identified during flight tests as being suspect or deficient. The third part consists of a two week Reliability and Maintainability Demonstration to gather data in a controlled environment.

The final five weeks of Phase I will be dedicated to QOT&E.

This test will provide assessments of the WSTs operational effectiveness and suitability by evaluating the systems against operational criteria. Personnel with the same qualifications as those who will eventually operate, maintain and support the WSTs will perform this evaluation. QOT&E will be both subjective and objective. Selected major system objectives, which are critical to mission accomplishment, will be evaluated by comparing demonstrated system performance against threshholds, standards and goals established prior to testing.

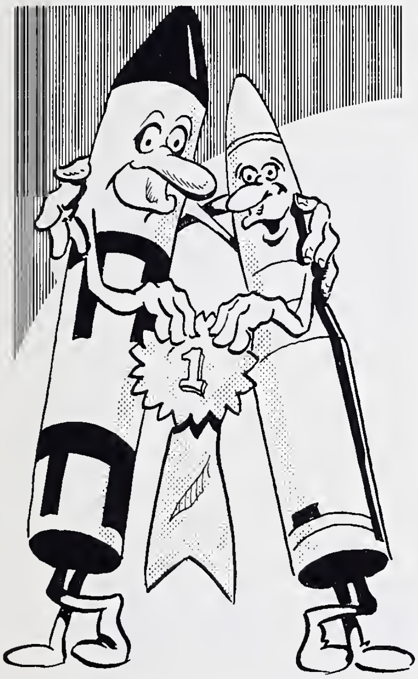
The prime participants in the WST test program are AFSC/ASD, AFTEC, and SAC. ASD will maintain overall management responsibility for the test program to include detailed management of the Qual test. AFTEC will manage the QOT&E. A significant factor in this test program is the participation of SAC personnel who make up the major portion of the QOT&E Test Team, which will function under the operational control of the AFTEC Test Director. Since the early stages of the program HQ SAC personnel have been involved in planning for the test & evaluation of the WSTs, but now as the test planning becomes more detailed much of the involvement has shifted to the SAC test team personnel.

Det 1, 4200 TES is the SAC unit responsible for the Test & Evaluation of Aircrew Training Devices and has provided much of the SAC manpower for the test team. Two Det 1 individuals have been selected as WST Deputy Test Directors to represent the AFTEC Test Director at each test site. They are responsible for the conduct of the QOT&E portion of the test. Two Logistics Supportability Evaluation Teams are composed entirely of highly skilled command development technicians from Det 1. These four man teams will conduct the operational suitability portion of the QOT&E, to provide both objective and subjective assessments of the systems reliability, maintainability, availability, logistics supportability, and operating costs. A third contingent will serve as members of the Software Assessment Team to evaluate the operational effectiveness and suitability of the system software. The objective of this assessment is to insure that the software programs are functional, flexible, and logistically supportable.

By far the largest contingent of SAC personnel involved in the test is the operational effectiveness team. The individuals who will form the two teams will come from the SAC crew force. Forty of the most highly qualified crew members available (4 B-52 crews and 4 KC-135 crews) will be sent to each contractor's facility to evaluate the fidelity, utility and instructional features of the WSTs. In addition to the QOT&E tests, the SAC test crews will be required to assist ASD during the flight/mission test portions of the Qual test and to support the ASD engineering tests.

The 80 crewmembers finally selected will, like all other members of the test teams, be required to spend approximately three months of TDY at either the Singer-Link facility in Binghamton, N.Y. or the Boeing-Wichita facility in Wichita, KS. System familiarization training began in August 1979 and testing in September. The equipment is to be available 16 hours per day, six days a week. Many long days will be necessary to complete the planned tests and insure that adequate data is made available to the source selection authority. Because of the sensitivity of the competition, all SAC personnel will be under close scrutiny and their input will have a significant impact on the award of the production contract. A large responsibility and a difficult task have been placed on the SAC technicians and aircrews participating in the test. However, acceptance of the task and conscientious discharging of the responsibility will insure that the Strategic Air Command receives the best possible device . . . one that guarantees that the SAC aircrews will remain the best trained and best prepared crews in the world.

DEBRIEF



WHO'S ON FIRST?

Recently, we were asked which unit holds the record for consecutive months of Titan or Minuteman Crew of the Month honors. We researched our files and came up with the following answers.

The 308 SMW and the 381 SMW each have had crews selected for five consecutive months. The 308th in 1969-70 and the 381st in 1973. Titan crews appear more frequently since there are only three wings. In Minuteman each wing, except the 44th, has had crews selected for three consecutive months.

The 308th has the most crews selected since Combat Crew began honoring missile crews in September 1963. The first crew was from the 578 SMW, Dyess AFB. The 351 SMW leads the Minuteman category with the 391 SMW and 91 SMW next.

Nominations for Titan/Minuteman Crew of the Month are forwarded by the unit DO through NAF channels to HQ SAC/DOMM where final selection is made by the HQ SAC staff.

NATIONAL SAFETY COUNCIL AWARDS

AWARD OF HONOR

7th Bombardment Wing
44th Strategic Missile Wing
96th Bombardment Wing

AWARD OF MERIT

1st Strategic Aerospace Division
1st Combat Evaluation Group
19th Bombardment Wing
416th Bombardment Wing
42nd Bombardment Wing
544th Aerospace Recon Tech Wing

AWARD OF COMMENDATION

307th Air Refueling Group
376th Strategic Wing
3901st Strategic Missile Eval Squadron
4000th Aerospace Applications Group
6th Strategic Wing

PRESIDENT'S AWARD LETTER

Det 4, 1st Combat Eval Group
Det 6, 1st Combat Eval Group
Det 8, 1st Combat Eval Group
Det 9, 1st Combat Eval Group
4235th Strategic Training Squadron

> **"Oh, I have slipped the surly bonds . . . danced . . . climbed . . . done a hundred things . . . wheeled and soared . . . hovering there . . . where never lark or even eagle flew . . . "**
>
> — *High Flight,* John Gillespie Magee, Jr.

INVISIBLE EQUIPMENT

"STEP ONE.
CHECK CANOPY?"

Capt Howard M. Harding
410 BMW, K. I. Sawyer AFB

Most of us are familiar with this poem, but when was the last time you did any of this as a crewmember without an airplane? All of our efforts in this area have been aided by products from the nylon novelty shop, otherwise known as Life Support. Should any of us actually attempt to "slip, dance, wheel and hover," our immediate loyalties will no longer be to AFR 60-16, the Form 781, or even the omniscient Dash One. Instead, our tenuous hold on life, then and for the next few hours, will depend upon Life Support products and our use of them.

A fish doesn't really see the water in which he swims; it's always been there. In the same manner, when was the last time you actually looked at your helmet, parachute and survival kit? My contact with Life Support is the same as any other crewmember, but perhaps more frequent in my role as squadron liaison officer. In this capacity I have been surprised by the ability of the average crewmember to survive. Much of what we do with our equipment is done by rote; we learned it long before we thought to ask why. What we have learned to do seems to stem from the unfortunate experiences of previous crewmembers and the accumulated wisdom on the part of dedicated Life Support personnel.

Most of us arrive at the aircraft with our helmet in the bag and more or less dry, protected from the elements. Ever wonder why Life Support gets so upset when the helmet gets soaked? If you have one of the new foam helmets, look at the leather on the inside. It's not as thick as the leather on your baseball glove; remember what happened to the glove when you left it in the rain? The oxygen mask is a marvel of complexity. The exploded diagram in the tech order for the MBU-5/P has 23 different components. As I understand it, somewhere in the valve system is a little washer that gets rusty, and replaced, if you say the word "moist." While you're at it, don't count on that bag for much protection. Many helmets get soaked by being in a bag in the back of an alert vehicle when it's raining on alert changeover. The other function of the bag is to transmit all exterior forces onto the portion of the helmet most likely to break: the visor-housing.

Monthly, I check the helmet bags stored in Life Support for the squadron. Why? It seems there were a lot of things stored in the bags other than helmets. We have an agreement here that allows us to put things in the exterior pockets of the bags; nothing other than helmet and oxygen masks shall be in the interior of the bag. Murphy's Law suggests that anything sharp or dull, can and will puncture the oxygen hose or gouge the helmet in some manner. What used to be in the bags? You name it: checklists, headsets, gloves, RON kits, thermal underwear . . . All of this is now stored in the side pockets. Our squadron has looked for reform and we haven't found orange peels in a long time, nor apple cores, and the person with a can of coke has learned a lesson. Cleaning that one bag, helmet and mask after the can exploded wasn't so bad. Cleaning the three helmets stored in the rack under that helmet brought home the point.

For all its faults, the helmet will do a lot for you in the dancing, soaring, hovering game. Ever try to break a visor? Seriously. Taxi on over to Life Support and talk them out of a condemned visor. We did that here at this base and then stomped all over it. None of us are 400 pound ducks or 200 pound freezers, but that visor still tired out four of us before we broke it. Even then, it just cracked. To those who wear glasses: ever think what the wind blast is going to do to the glasses when you eject? A tight oxygen mask, a well-fitted nape strap and a lowered visor may actually keep the helmet on the ejectee's head should the need arise. And if you try soaring and hovering at altitude without your helmet, how are you planning to breathe from the green bottle?

Did anyone else notice this superb connection/transition to the parachute? And what could possibly go wrong with a parachute? It just sits there and gets checked before every flight. During the last flight though, did it get a bath? Wet, packed parachutes are a lot like wet magazines: neither one will open very well. Is the gold key entangled in anything — like the seat belt? An inadvertent firing smells up the cockpit, embarrasses a lot of people, and causes the entire mechanism to be replaced. On the new 'chutes the mechanism is quite expensive. Assuming you actually use the parachute for an ejection, can you turn off the locator beacon? With either hand, in the dark, still wearing the parachute? It must be very frustrating to eject and land in some trees, finally work a survival radio out of the seat kit, and then discover that the emergency frequency is being jammed by your very own locator beacon. Think how much more fun this would be with a broken arm. While you're rummaging around in the survival kit, where do you think the sleeping bag is located? If you're at Base X, Y, or Z, on the northern tier it might actually be there. If you don't fly out of the North, your sleeping bag is still at the factory being repacked. Is this a surprise to anyone? Is there anyone else out there who has been flying with a "space blanket" in his pocket for the last 18 months? A lot of the Life Support shops will issue this item upon request; an alternate source is the BX for about $2.50.

Even if you fly out of the northern tier, you aren't safe yet on the sleeping bags. If you happen to be out of your ejection seat for a personal errand at the time of a sudden emergency, do you think the person occupying your seat will demonstrate leadership by showing you how to leave the area? All this adds up to you doing a manual bailout with the ML-4 (softpack) strapped to your butt! If you remember it and if you knew how to put it on. One delightful thought about the softpack: it's not even supposed to have a sleeping bag in it. I realize that it never rains or snows and the wind doesn't blow down south; they don't even have to worry about hypothermia. Up north, it's a different story. Anybody else interested in a space blanket?

Have I started anyone thinking about any of this? If so, here are some suggestions. Get to know and to love your life support equipment. One way to do this is to visit the Life Support shop and show an interest in what gets strapped around your body. They can always use a volunteer to stand on the lid of the seat kit and you can watch while it gets packed full with equipment. Go over and watch a parachute get put into its bag. There's a lot more on your back than just the canopy and risers. Next time your helmet is due for an inspection, ask if you can watch. The more we all get used to looking at our equipment and actually seeing it, the less invisible gear we will have around us.

Colonel Joe L. Church
HQ SAC/DOM

job enrichment for TITAN II CREW DUTY

It's common knowledge in SAC that combat crew duty is not exactly every man or woman's piece of cake. In fact, during most seminars or conferences hosted by various headquarters SAC staff agencies, crew member discussions will eventually center on the drudgery of crew duty. Needless to say, we on the SAC staff hear the complaints and are striving to improve the crew member's way of life.

There are many methods available to surface crew duty related issues for review and possible change. Everyone is aware of the Air Force Suggestion Program, the SAC Alert Panel, and the recently implemented SAC Buck Stop Program. However, we in the Directorate of Missile Operations have become involved in a new approach for which we have high hopes.

In late 1978, the SAC job enrichment program manager, Captain John Ottino, proposed a job enrichment program for TITAN II crew members. He didn't promise fantastic results; however, the program appears to be a good avenue for getting a unit's crew members and staff together to really examine the gut issues affecting the situation. The intent of the program was simply to effect changes that would enhance the job of TITAN missileers.

Two TITAN units, 381 SMW at McConnell AFB and 390 SMW at Davis-Monthan AFB, volunteered to host a job enrichment program focusing on their missile combat crew members, and Captain Ottino was off and running. In March and April, he traveled to both bases to give job attitude surveys to the crew members. Then, after compiling the survey results, he began a series of workshops at each unit. Participants included the unit DO, his staff, and 20 crews. During these workshops, the participants were briefed on the mechanics of job enrichment and the results of the job attitude survey. In addition, three groups were formed (the DO and his staff, officer crew members, and enlisted crew members) and asked to generate ideas that would improve the crew member's job. As a result, numerous issues surfaced with approval authority covering the gamut from unit to Air Force level.

The enthusiasm and interest of the two participating wings, the NAFs and SAC prompted the 308 SMW, Little Rock AFB, to come on-board and actively participate in the job enrichment program. With the involvement of the 308th, we now have 100% of the TITAN crew force participating.

Now the question that comes into everyone's mind is, "What will happen with all these suggestions?" Here's how they are being worked. Each unit formed an implementing or steering group to locally evaluate the ideas to determine which ones are worth pursuing for possible implementation. The group is comprised of the DO, his key staff members, and representatives from the line crew force. Many of the ideas can be implemented at the local level, while others will require Numbered Air Force, MAJCOM, or Air Force approval. If the implementing or steering group cannot implement the idea locally, they will forward it to the appropriate level of command for resolution. Each idea should be staffed and implemented at the lowest level, and feedback on all ideas, whether approved or not, will be provided to the submitting unit.

No matter how you look at it, this program is an excellent opportunity for TITAN crew members to address new as well as old ideas, and forward them to the appropriate level of command for consideration and possible implementation. We at SAC headquarters are looking forward to addressing the TITAN job enrichment suggestions and feel confident that many positive changes will result. The cooperation and participation of those involved in this program is greatly appreciated; however, let's not forget that the program is only as good — or bad — as we make it.

READINESS

Continued from Page 3

have recently experienced a major SAC aircraft mishap in which an engine plummeted to the ground during flight. Why this happened can be related to a series of undisciplined attitudes toward a "common" engine problem by people who knew better. A tragic missile accident in which people's lives and a multimillion dollar TITAN ICBM complex were lost following a routine oxidizer upload operation reveal a series of undisciplined personnel actions and reactions. Both of these situations, in different measure, reflect the disaster resulting from a lack of personal discipline. Many of the things we do as a matter of course are inherently dangerous. We cannot be lulled into a false sense of security through repetition; we cannot casually accept abnormal conditions as "breaks of the game;" and we cannot routinely substitute "common sense" and "experience" for established technical procedures. Safety is the tangible dividend of a discipline which drives us to do things right the first time every time.

A fourth factor is personal involvement in safety. Commanders and supervisors must lead the way, but involvement must permeate our entire organization. We can ill afford apathy and complacency in a demanding profession such as ours. We must understand, accept, and act upon our responsibilities to ourselves and to those around us. Involvement is the translation of awareness, discipline, and precious time into tangible action. It is, in fact, the common denominator for safety.

Our Command regularly compiles large amounts of narrative and statistical data and "lessons learned" pertaining to safety. We publish magazines and other literature on the subject. But although the stage and the players change, what we learn from this information remains basically the same. This is not to say that compiling and analyzing the information is of little or no value. It is to say, however, that what really counts is what we do with this information; how we act upon (not react to) what it tells us; what we do to make the statistics not only fewer, but less necessary.

We have come a long way since that day in 1903. Although we have made great strides to get to now, we also realize that our horn of plenty has a bottom. Our resources are limited and must be used wisely. An integral part of any efficient and productive organization is safety. It allows us to do what we must with minimum waste and loss of resources. The business of maintaining a safe, ready defense establishment is yours, mine, and ours.

It really can work!

ACE TOPICS

SINK RATE AND THE T-38

Maj John Myer
ATC Flight Safety

It was with the appearance of the Century series aircraft that a gap developed between the performance of training aircraft and operational fighters. The engineers got their heads together and developed the T-38 as the answer to this training gap. This aircraft, which has been used to train pilots since 1961, has handling characteristics that approach those of high performance fighter aircraft. The T-38 has done a commendable job in accomplishing the mission for which it was intended. However, the T-38 brought with it the undesirable high performance aircraft trait of **high sink rate problems.** Living with the sink rate problem requires understanding of the cause and the use of published landing parameters.

Let's start by looking at the causes, since this dictates the landing techniques we use. First, there is a vast difference in lifting characteristics between the conventional straight, wide-spanned, high-cambered wing and the stubby, swept, thin wing of the T-38. The lift profiles for the two types of wings I have mentioned are shown in Figure 1.

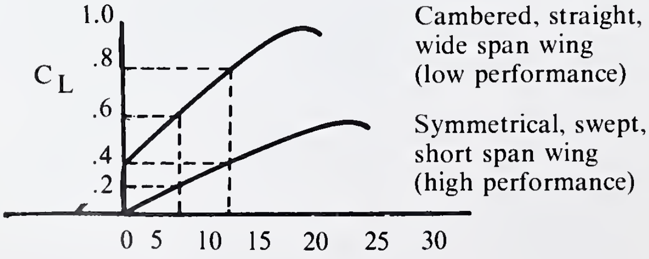


FIGURE 1

The lift coefficient curves tell us that if we "honk back" on the stick to increase our angle of attack, we will get considerably different results for the two wings shown. The low performance wing gives a considerable increase in lift for only a slight change in angle of attack. (Five degree α change causes 0.2 C_L change.) The high performance wing gives a much smaller increase in C_L for the same change. (Five degree α change causes 0.1 C_L change.) It is also significant to note that the maximum C_L attainable for the high performance airplane is lower than that of the low performance wing. This means that to increase lift in an attempt to stop a descent rate in the T-38 requires considerable increase in angle of attack and the results of this increase may be limited. Also, as lift is increased, you have to remember that lift does not act alone. That brings us to drag.

Total drag on an airplane is the sum of induced drag and parasite drag. The big player at low speeds is the induced drag. This is illustrated in Figure 2.

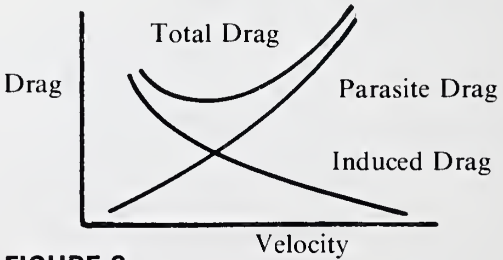


FIGURE 2

At slow speeds, where we fly final approach, the drag curve is fairly steep. Flying at slower airspeeds means large increases in drag on the airplane. But, even if airspeed is maintained, it must also be remembered that increasing lift by pulling on the stick still increases induced drag. We don't have to fly at lower airspeed in order for the drag to increase. This is illustrated in Figure 3.

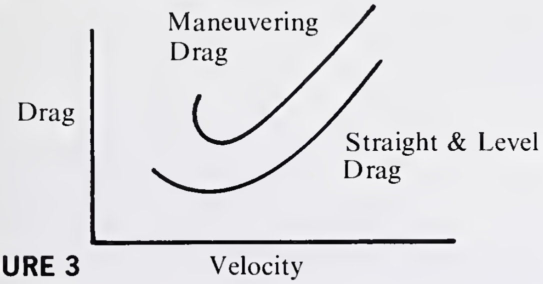


FIGURE 3

Figure 3 illustrates that the coefficient of induced drag varies with the square of the coefficient of lift and inversely with the aspect ratio.

$$C_{Di} = \frac{C_L^2}{AR}$$

Hence, pulling on the stick increases C_L thereby increasing lift but it also brings an added penalty of induced drag that is the square of the coefficient of lift. This almost instantaneous increase in induced drag brought on by attempts to increase lift, can cause rapid loss of airspeed and continuation of a descent. This increase in induced drag has to be anticipated to allow for engine acceleration time. So much for the review on lift and drag; now let's look at how our procedures keep us out of trouble. In order to do this, let's look at three types of approach. These are shown in Figure 4.

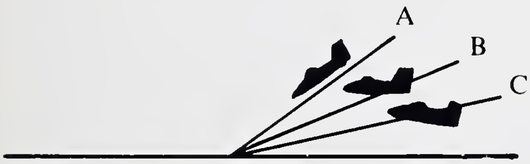


FIGURE 4

Approach path A depicts the steep, low power approach. Such a flight path could be encountered from late transition to visual references on a nonprecision approach or attempts to be a "tiger." The result is a low power setting near idle and a high rate of descent. Precise control of the airplane (falling rock) is difficult and an excess airspeed may develop. Arresting the descent or a go-around may be difficult or impossible because of engine acceleration time, instantaneous increase in induced drag brought on by increasing pitch, and the inertia of the descent rate. In addition, the steep approach path with high rate of descent requires considerable flare making consistency and control of touchdown very difficult.

Approach path C, the long shallow approach with too small an inclination of flight path, requires high power settings. Airspeed is difficult to maintain and tends to be low due to high induced drag associated with high angles of attack. Flare capability is reduced since some angle of attack is used up in maintaining the flight path. Chopping the throttles will usually give a dropped in touchdown. Also a danger exists that the airplane may settle prematurely short of the intended landing touchdown zone.

Now, as you have no doubt guessed, the proper approach path lies between the extremes of A and C, e.g., flight path B. This desirable approach path does not involve a high rate of descent or require excessive flare prior to touchdown. Also, a moderate power setting must be used which allows accurate control of airspeed and enhanced go-around capability. In short, there is less room for faulty judgment.

For the T-38, the desired B type approach is attained by passing through approximately 400 AGL at one nautical mile from the runway. A flight path through this point to the end of the runway establishes the desired approach angle for the T-38. On straight-in approaches, VASI, ILS or radar monitoring can be used to aid in establishing a safe flight path for landing.

In summary, we've never lost a T-38 in a VFR pattern because the pilot didn't see the ground — but we have lost them because they didn't see the SINK-RATE until it was too late.

U-2 PILOTS NEEDED

The 99th Strategic Reconnaissance Squadron is looking for captains with diversified flying experience to fly the U-2.

Prospective U-2 pilots will come to Beale TDY for a comprehensive interview, aeromedical evaluation and a minimum of two flights in the U-2 trainer. The flights insure that candidates have the basic flying skills required for the U-2 prior to being selected for a PCS to Beale.

Once selected, the student again flies the trainer for at least five missions before soloing in a single seat aircraft. If you're interested in the program, check with the Special Duty Assignment section at your CBPO and review the specific requirements in AFR 36-20, Chapter 8. If you meet the requirements and want additional information, call the U-2 Manning Office at Beale AFB, 368-2156.

CFIC Corner

"Can you teach an old (crew) dog new tricks?"

Don J. Currie, Captain, USAF
CFIC KC-135 Brn Instr Navigator
Carswell AFB, TX

The electronic age is here! Every day we see more and more "gadgets" designed to make our lives more enjoyable. We are all pretty quick to embrace new technology at home. Most of us have at least one calculator we use to keep track of the checkbook or figure the family budget. We connect electronic games and videorecorders to our television sets and we cook our meals in microwave ovens. But, when it comes to our jobs, many of us are reluctant to leave the old familiar routines and equipment for something new. However, changes are becoming more and more common as our older airplanes are upgraded to fly in today's modern aerospace environment.

Both inflight and during ground training we are seeing more and more electronic devices to make our jobs easier, quicker, and more accurate. SAC aircraft are currently being upgraded with devices such as inertial navigation systems, AFSATCOM, and improved bombing navigation systems. Many crewmembers are now using hand-held calculators as an aid during mission planning and inflight. Navigators will soon be able to "fly" navigation legs on a computerized celestial navigation trainer. The electronic age is definitely with us.

"So what!" you say. "I don't need all that fancy stuff. I've been doing fine without it for years. Let the young guys play with their calculators and gadgets and I'll just keep doing my job like I know best." Your reasoning might be acceptable if you are not an instructor and never plan to be one. But, whether you realize it or not, you *are* an instructor! Every time a "bull session" turns to flying and you put in your "two cents worth", other crewmembers are listening to what *you* say. That makes you an "informal" instructor — even if you are not on instructor orders.

As an instructor, formal or informal, you owe it to yourself and your squadron to stay informed as new developments occur. It is a little extra work to learn all the details of a new system, or to go out of your way to discover how that new lieutenant's fancy little calculator works. But if you do, you benefit not only yourself, but all those who work around you.

Once you acquire a little extra knowledge, you will be surprised how often you get to use it. Anything that is new in the airplane or that makes our jobs easier is bound to be a topic of conversation around the squadron and alert pad. If you have the "straight word" about a new system, then you can correct misconceptions that other crewmembers have about that system.

It may seem easy *now* to justify to yourself not learning about those new electronic "gadgets", but what about a year or two years from now. Those same "new" gadgets will then be "old hat" to most crewmembers and there will be more new technology to learn by then. If you do not start now, you may find yourself left behind by the rest of the crew force.

As you learn more about new aircraft equipment, calculators, computers, and other marvels of the electronic age, you will lose those feelings of apprehension you once had and discover that they really can make your job easier. Don't put it off any longer. Get comfortable with the electronic age.

FISH or CUT BAIT

Capt John R. Moock
93d BMW, Castle AFB

Occasionally, we have to look at ourselves in retrospect. When we get up in the morning, stand in front of the mirror to shave, and ask ourselves, "What am I really accomplishing in my job? Where do I fit into the big picture? Can I see the fruits of my labor? We are groping for answers to questions generated by uncertainty.

Some questions may not have easy answers. Perhaps your present job is really a job that will lead to a job . . . that will lead to a job . . . that will lead to a job, all of them seemingly meaningless or boring. Maybe you *need* a particular job to get promoted. Maybe that job will give you some needed visibility. Maybe.

There are a lot of people in the Air Force today who are just filling squares, partly because some well-meaning career advisor said that this was the way to succeed in the Air Force. When we look at our heritage, we will see that we got to where we are today by flying and fighting, or being able to fly and fight, but not by filling squares or letting someone else do the flying and fighting.

There are some others of us around who are more interested in flying and in job quality and job satisfaction than in simply using one job as a stepping stone to another. There are some of us who are more interested in doing a good job at what we were trained to do and leave the more mundane activity to those who prefer that sort of thing. Among these are the professional instructors at Castle AFB.

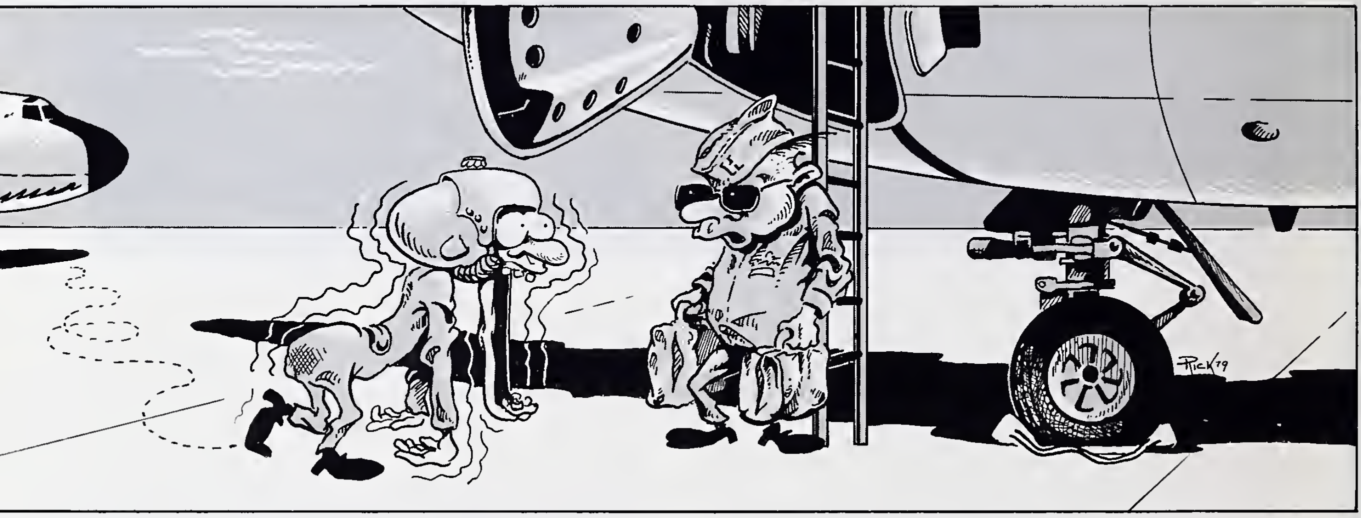
If you are a SAC instructor in any flying specialty, and if you are seeking a job where you can realize the fruits of your labor every day, there are opportunities which may be exactly what you are looking for at Castle. Watching the progress of your students as they learn to fly complex weapon systems is one of the most rewarding of instructional experiences. The relaxed but dynamic atmosphere of the Castle training environment aids the learning process and develops strong relationships between instructors and students. As an instructor at Castle, you will be accepting more responsibility than you probably have now and you will see your own knowledge increase dramatically. You will become a truly professional instructor. If you enjoy instructing, this could be the job for you.

Perhaps you just love to fly. At Castle, we fly more than any other bomb wing in the command; we have quality flying. The staff supports us and there is no after-the-fact second guessing about our decisions. We fly a lot and enjoy it. The instructor corps at Castle has an esprit seldom seen in today's Air Force. When was the last time you went to happy hour and talked flying? We talk flying, think flying and teach flying. Flying is how the Air Force got to where it is today and how it will meet its goals for tomorrow. This is what we believe and what we teach. If this is your cup of tea, we urge you to join us.

Simply because we concentrate on flying, as opposed to square filling, doesn't mean that you lose the opportunity to get promoted by coming to Castle. Here there is ample opportunity for career advancement. Although line instructor duty is great and extremely rewarding, there are always requirements for academic instructors, ISD experts, evaluators, staff officers, and CFIC instructors. The CCTS flying and academic schedules allow attending evening classes for those who wish to complete work on advanced degrees or complete professional military education programs. Generally speaking, outbound assignments from Castle have been excellent. The experience gained here will become invaluable in the future since flying experience and expertise are rapidly becoming a scarce commodity.

Remember, Castle is looking for people who love to fly and love to instruct. Now may be the time you must decide to *"fish or cut bait."* If you are interested in the challenge. If this is your bag, change your AF Form 90 and call SAC personnel. You won't be disappointed. We need top-notch professional flyers and will welcome you with open arms.

OPS HAZARDS



"THAT CLOSE, EH CUSHMAN."

IFR + VFR = HATR

Protected by my IFR clearance in this IFR route, I'll relax a little and enjoy the ride/scenery till the IP . . . **where's what traffic!**

How many times has an aircraft commander or aircrew been lulled into this contented position. Hazardous Air Traffic Reports (HATRs) in recent weeks warn all flying personnel to eliminate any low level complacency established by an IFR clearance. In almost every case, both the IFR and VFR aircraft were legal in their operation. The military aircraft adhered to the route as published in FLIP 1A/B and filed in accordance with AFR 60-16 on the DD Form 175. Likewise, the VFR traffic has operated legally in these areas. In some instances, knowledge of the specific route has not been recognized, but VFR principles were being followed. There have been many cases of aircraft transiting military training routes. General aviation maintains the freedom to operate visually and will continue to do so. One means to stop these occurrences would be to make all low level routes military restricted operating areas. Even this action would still not stop that occasional aircraft from flying into or through the area (the good old 10% rule). Besides, this type of restriction would severely limit general aviation and limit the number of military training routes. Until instances become extremely frequent, this type of action is probably not warranted.

Don't think all conflicts occur only between multiengined aircraft and civilian aircraft. A recent report stated that two B-52s flew the same low level segment but in opposite directions. Almost nose-to-nose time, but both aircraft visually acquired each other and a collision course was avoided. In another situation, a bomber aircraft and fighter came quite close to each other in the low level structure. A near-miss occurred with a miss distance not too great.

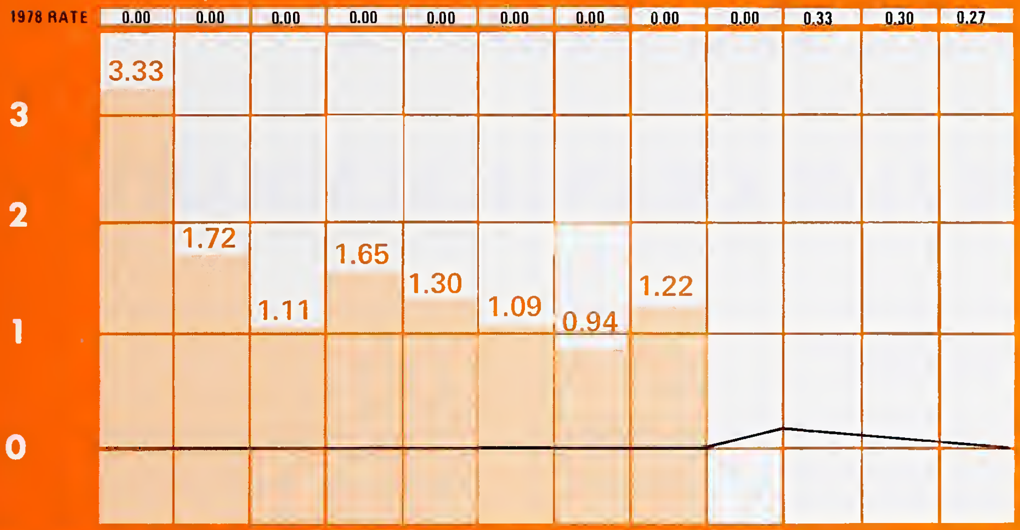
Every crewmember must be aware that VFR traffic will pose a problem sometime. The see-and-be-seen principle must be followed while under an IFR clearance. Traffic conflicts are not limited to low level military training operations. Each base is located near a transportation net or some specific terrain feature that invites aircraft navigation. The best course of action is to be alert and defensive during each phase of flight.

Air traffic conflicts may occur in the takeoff, approach, and landing phases of flight. Taxiing in after mission completion is not sacred either. Distraction to personnel operating other aircraft, vehicles, and equipment still could make your aircraft vulnerable to a mishap.

Taxi, takeoff, fly and land safely. If an incident occurs, submit a HATR. Better to investigate and correct these situations, than to investigate the loss of crew personnel and or a valuable aircraft.
— Maj Richard F. Johnston, IGFF

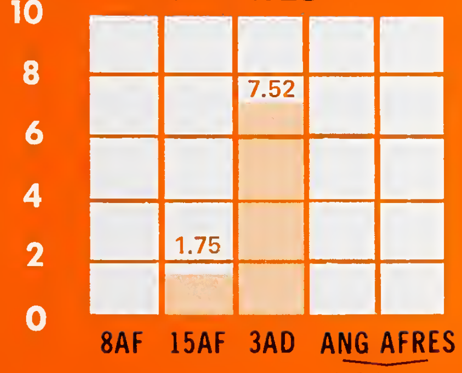
1979 Flying Safety Rate

SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)



MISHAPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1978	0	0	0	0	0	0	0	0	0	1	0	0
1979	1	0	0	1	0	0	0	1	2			

1979 SUBORDINATE CMD RATES



MISHAP STATUS

B-52H	JAN 79
KC - 135Q	APR 79
RC - 135	AUG 79
FB-111	SEP 79
RC-135	SEP 79

LEGEND ⁀ = 1978 RATE (SAC)
+ = ANG
• = AFRES

BIG INSTRUMENT

AFM 51-37 CHANGE SUMMARY

Captain John J. Ondrejko
Instrument Division
1st Combat Evaluation Group
Barksdale AFB, Louisiana

The new AFM 51-37, Instrument Flying, should be in your hands by now. (It's dated 15 August 1979.) If you don't already have it, look for it soon.

There are not as many major changes in this revision as the past one. Some text has been added about topics you're already familiar with: ILS localizer width, area navigation (RNAV), visual descent points (VDPs), and altitude restriction on an SID. But there are two major procedural changes we want to highlight for you. The 2½° criteria for descent when radar vectored to an approach has been deleted. And a distinction has now been made between a missed approach and "climb-out instructions."

Instrument School OICs received a detailed briefing on all the changes at a conference at Barksdale on 8-9 August 1979. We are following up that briefing with a written summary of all changes for each Instrument School OIC.

The purpose of this article is to provide a summary of the significant changes. A large part, but not all, of the following information is verbatim from the new text.

CHAPTER 1

Full scale deflection on the course deviation indicator differs with the width of the localizer (3° to 6°). Example: If the localizer course is 5° wide, then full-scale deflection is 2½° and each dot represents 1¼°; if the localizer course is 3° wide, then full-scale deflection is 1½° and each dot represents ¾°. The glide slope indicator (GSI) displays glide slope position in relation to the aircraft. If the GSI is above center, the glide slope is above the aircraft and vice versa. Full-scale deflection of the GSI differs with the width of the glide slope (1° to 1.8°). Example: If the glide slope width was 1°, full-scale deflection would be ½°, and each dot would be ¼°.

The localizer antenna provides coverage of the final approach course. There is a possibility of receiving on-course indications when the aircraft is not within the depicted area of coverage. Since the possibility of receiving false course indications exists only in the area from 35° to 90° of the final approach course, crew members should disregard all course indications received in this area. Use accurate position orientation to determine if proper on-course indications are being received.

Area Navigation (RNAV) information has been expanded to include established or designated RNAV routes, random RNAV routes, and instrument procedures for RNAV aircraft.

CHAPTER 2

The aircraft is considered to be maintaining the course centerline when the CDI is centered or the bearing pointer points to the desired course. NOTE: Pilots should always attempt to fly as close to the course centerline as possible. TERPS design criteria will provide maximum obstacle clearance protection when the course centerline is maintained.

CHAPTER 3

Straight-in approaches are identified by the type of navigational aid(s) which provide final approach guidance and the runway to which the final approach course(s) are aligned. A slash (/) indicates that more than one type of equipment must be used to execute the final approach. Example: VOR/DME, ILS/DME, etc. When procedures are combined, the word "or" shall indicate either type of equipment may be used to execute the final approach. Example: ILS or TACAN, ILS or NDB, VOR/DME or TACAN. Some VORTAC approaches are designated so that VOR only equipped aircraft may also fly the approach. If you have VOR only, study the approach to determine if DME is required.

Visual Descent Point (VDP). The VDP is a defined point on the final approach course of a nonprecision straight-in approach procedure from which a normal descent (approximately 3°) from the MDA to the runway touch down point may be commenced, provided visual reference with the runway environment is established.

The VDP is normally identified by DME. A 75 MHZ marker may be used on those approaches where DME cannot be implemented. VDPs are not a mandatory part of the procedure, but are intended to provide additional guidance where they are implemented. A VASI lighting system is normally available at locations where VDPs are established. Where VASI is installed, the VDP and VASI glide paths are normally coincident. No special technique is required to fly a procedure with a VDP. However, in order to be assured of the proper obstacle clearance, the pilot should not descend below the MDA before reaching the VDP and acquiring the necessary visual reference with the runway environment. The VDP is identified on the profile view of the approach chart by the symbol V.

CHAPTER 4

When checking the VOR/TACAN at a designated ground check point, ensure that the allowable CDI error is ±4° and the CDI and bearing pointer agree within the tolerances specified for the aircraft. If the aircraft has dual VOR or dual TACAN receivers, the systems are considered reliable for instrument flight if they check within ±4° of each other.

While performing a Standard Instrument Departure (SID), if there is any question regarding the intent of a clearance received, query the controller. After you have established initial contact with departure control, a controller may issue a clearance to climb to a specific altitude. Unless the controller specifically includes other altitude restrictions in that clearance, you may disregard the SID altitude restrictions and climb unrestricted. When an aircraft is radar vectored or cleared off of an assigned SID, pilots will consider the SID cancelled. If ATC reinstates the SID, they will indicate that portion of the route and altitude restrictions which are applicable (refer to FLIP GP for additonal SID guidance and two-way radio failure procedures).

CHAPTER 6

If cleared for an approach while enroute to a holding fix which is not collocated with the IAF, you are expected to proceed to IAF via the holding fix, unless specifically cleared to proceed direct to the IAF. However, if the IAF is located along the route of flight to the holding fix, you are expected to begin the approach at the IAF. If in doubt as to the clearance, query the controller.

Terminal routings from low altitude enroute or feeder facilities normally provide a course, range, and minimum altitude from the enroute structure to the IAF, but may take the aircraft to a point other than the IAF if it is operationally advantageous to do so. When you use other than a published routing, do not exceed the operational limitations of the selected NAVAIDS. A low altitude IAF is any fix labeled as an IAF or any procedure turn/holding in lieu of a procedure turn fix.

If a penetration turn completion altitude is depicted, do not descend below this altitude until you are established on the inbound segment of the published approach procedure. Remember, maximum design obstacle clearance is based on the pilot attempting to maintain the course centerline; a pilot must use position orientation and pilot judgment to determine when to descend while attempting to intercept the course.

The circling minimum descent altitude (MDA) and weather minima to be used are those for the runway to which the instrument approach is flown (this is not always the landing runway). No provisions for circling from a PAR approach have been established. Therefore, circling from a PAR approach is unauthorized.

A distinction between missed approach instructions/procedures and climb-out instructions has been added. "After completion of your low approach/touch and go/stop and go/ the option, climb and maintain (altitude), turn right/left heading (degrees)." Since these instructions are climb-out instructions, comply with them only after completing the required maneuver. Unless otherwise instructed, you may initiate an immediate climb to the assigned altitude, but delay any turns until past the departure end of the runway.

Notify ATC that you are initiating climb-out (use of the term climb-out indicates the pilot is following previously provided climb-out instructions). Do not use the term "missed approach" if you are following "climb-out instructions," since the airspace and air traffic procedures involved in the two maneuvers may be different.

PROFESSIONAL PERFORMERS

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence outlined in SACR 127-2.

SAFETY OFFICER

Major John Wiley III, as the 19 FMS Ground and Nuclear Safety Officer, displays innovative approaches to safety. His efforts enabled his squadron to win the Wing Quarterly Safety Award three out of the last four quarters and his selection as Safety Manager of the Month five times in the last year.

He discovered an inconsistency within maintenance tech data pertaining to microwave radiation and he compiled all the necessary data to enable maintenance and aircrew personnel to more easily comply with flightline safety regulations. Major Wiley is highly motivated and dedicated to all facets of safety and most deserving of recognition as the SAC Safety Officer of the Month.

HEADS UP

Maj David M. Peters, SR-71 aircraft commander, and his reconnaissance systems officer (RSO), Capt Edgar J. Bethart, Jr., were scheduled to fly a classified, operational SR-71 reconnaissance sortie. During the recovery phase of the sortie, they experienced a serious aircraft engine malfunction.

The aircraft's right engine experienced a series of compressor stalls due to a right engine system failure. Maj Peters evaluated the situation and decided to shut down the engine and make an emergency single engine approach and landing. As the aircraft was descending to radar pattern altitude, the left engine oil pressure started to fluctuate and the oil quantity started to rapidly deplete. Faced with the impending loss of the left engine, Maj Peters attempted a restart on the shutdown right engine. Although the restart was successful, the engine continued to compressor stall. The compressor stalling engine provided flight control hydraulic pressure, but provided little additional thrust.

The left engine began to surge as the aircraft approached one and one-half miles on final and white vapor was observed coming from it. Maj Peters confirmed the RPM was unwinding toward idle, and realizing that with zero oil pressure, the engine was in the final stages of flaming out and seizing, he placed the throttle to the cutoff position and completed the landing and shut down the right engine to prevent an overtemp condition.

The cool deliberation and skills displayed by this crew during a multiple emergency situation merit their selection for the SAC Combat Crew Heads Up award.

MAINTENANCE NCO

SSgt Richard C. Oliver, 380th AMS, Plattsburgh AFB, has been selected as the SAC Maintenance NCO of the Month. Sgt Oliver, a navigation/tactics training devices technician, earned this award for outstanding initiative, leadership abilities and technical competence. While attending an advanced maintenance course on the Singer/Link Digital Image Generated Full Day/Night Visual System, his contributions to the class were directly responsible for numerous improvements in the course curriculum which promoted a better understanding of this unique system. He demands maintenance of the highest quality and goes the extra mile in troubleshooting and diagnosing malfunctions. This perseverance enabled him to identify a simulator hydraulic pump problem and through extensive research, he effected the necessary pump realignment saving a significant amount of money and man-hours. Sgt Oliver, a dedicated non-commissioned officer, is a valuable asset to the SAC maintenance function.

MINUTEMAN CREW

MINUTEMAN Crew S-040, 44 SMW, Ellsworth AFB: MCCC Capt Robert G. Bump, and DMCCC 1Lt Thomas K. Conlon.

The 44th SMW Crew S-040 was preparing for a crew changeover when they received a call from DO9 stating that a chromate line had ruptured and exploded spraying chromate into maintenance personnel's eyes. Acting quickly and proficiently the crew accomplished their contingency checklist by making calls to Ellsworth Command Post, Job Control, the base hospital, and insuring that a quick dispatch for a helicopter was enroute. After completing changeover, the crew departed their station for DO9. Upon arrival, they quickly administered first aid, and awaited the helicopter's arrival. Due to the utilization of knowledge and resources, the amount of injury to the individuals was kept to a minimum thus decreasing the loss of critical maintenance man-hours. The proficiency, professionalism and dedication that Capt Bump and Lt Conlon demonstrated is noteworthy and well deserves their selection as SAC Missile Combat Crew of the Month.

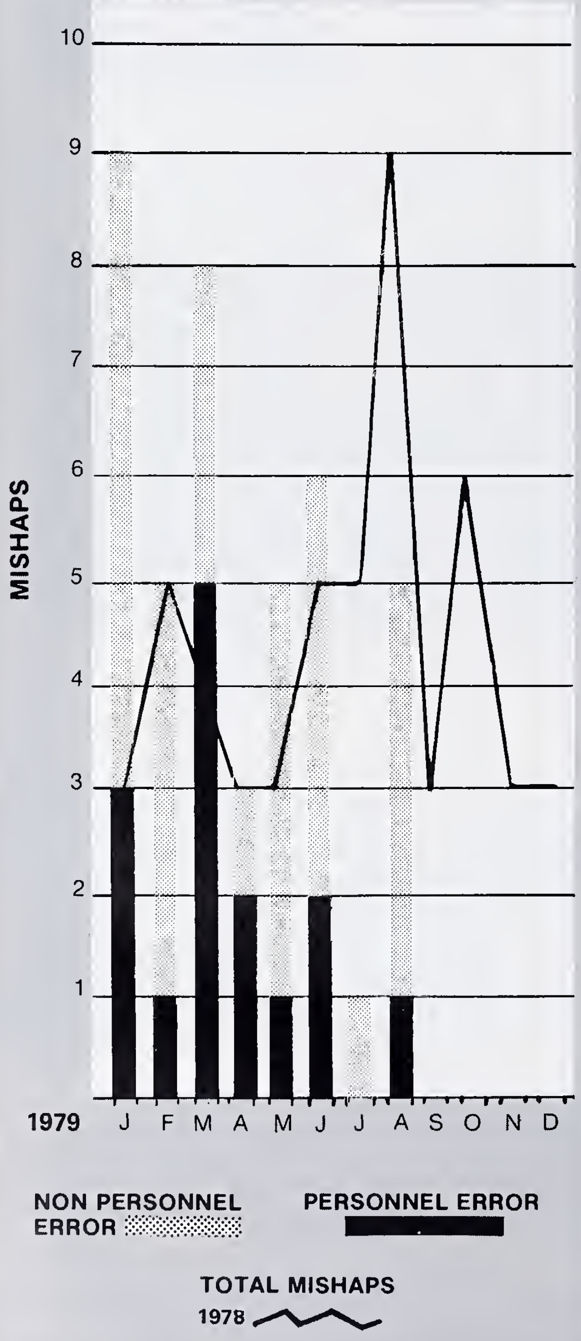
TITAN CREW

TITAN Crew S-240, 308 SMW, Little Rock AFB: MCCC Capt John D. Sullivan, DMCCC 2Lt Thomas B. Bonkofsky, MSAT Sgt Sidney K. Grosshart, MFT Sgt Joseph E. Land.

Instructor Crew S-240's performance to date has been exemplary: they have consistently demonstrated noteworthy initiative, professionalism, and superior weapon system knowledge. Crew S-240's ability to react dramatically while under extreme pressure was evident during the recent SAC exercise, Global Shield. The crew accessed Plumbing Shutoff at the appropriate step in the Pre-Attack Damage Prevention Checklist. When they were called upon to remove Plumbing Shutoff, five plug valves malfunctioned and remained in the closed position. This disrupted the normal cooling water flow and caused a dangerous increase in the launch duct temperature. The crew diagnosed the malfunction correctly and promptly returned the valves to their required positions. The crew discovered yet another malfunction when they determined that the cooling towers were not operating and there were several inches of water in the cooling tower pit. Already prepared for this possibility, Capt Sullivan directed Sgt Land to manually activate the cooling tower motors to regain circulation of cooling water. The potentially disastrous situation was averted when the rising launch duct temperature stabilized and rapidly retreated to a reading within operational limits.

Missile Mishap Report

DOD CLASS A, B and C



WINTER MISHAPS

Maj. Stephen Forbes
Chief, Missile Safety, SAC

Last winter snow plows accidently struck and caused damage to equipment on several of our Minuteman facilities. Most of the time these mishaps occurred when the equipment was covered by snow or when snow removal equipment was covered by snow or when snow removal equipment was not properly prepared. There are several items on a site which are easily buried by snow. Additionally, some permanently installed site equipment hampers the easy access to areas where a snow plow may go in order to accomplish the necessary snow removal. Sometimes sites have to be cleared in a short time in order that priority maintenance may be accomplished. This adds to the fatigue factor of the equipment operators and may also lead to a mishap situation.

The important thing to keep in mind at this time of year is to take some preventive measures now. Snow removal equipment can be inspected now to insure its proper operation, more frequent inspections may be necessary during the "season." Equipment operators can be identified and troublesome spots on the site can be reviewed and identified. Contractors should also be made aware of these same hazards. Finally, personnel should have a plan to follow in the event of equipment failure, fatigue, or blizzard conditions.

A key factor is to anticipate the problems that may arise during the coming winter season and to be prepared to overcome them. An individual that is trained and thinks about what to do in unusual situations will react better and be prepared to respond in a safer manner.

SAC SAFETY SCREEN

5 BMW, Minot Crew E-124: P Capt Lawrence R. Keller, CP 2Lt Frederick L. Jaklitsch, NN Capt Scottie L. Smith, BO A1C Michael B. Yates

6 SW, Eielson Crew S-02: IP Capt Garrison L. Smith, CP Capt Craig T. Scott, IN Capt Jon W. Anderson, NN 1Lt Edward T. Marino

6 SW, Eielson Crew S-11: TC Maj Joe G. Schneider, ATS Capt Donald A. Freeman, ATS Capt Jeffrey K. Hutchinson, R4 Capt Jeffrey M. Williams, MT Capt Donald C. Smith, PT TSgt Thomas J. Youngblood, Jr, ET MSgt Robert J. Hickey

22 BMW, March Crew R-33: P Capt Mark C. McKenzie, CP Capt James L. McGregor, NB Capt James R. Prideaux, NN 1Lt Glenn A. Pallazza, EW 1Lt Stanley H. Eddleman, AG Amn Michael A. Pratt

2 BMW, Barksdale Crew E-11: P Capt Timothy G. Krysiak, CP Capt Thaddeus Jones Jr, RN Capt Donald L. Mooring, NN 1Lt Charles A. Morgan, NE Capt Lee V. Hoffman Jr, AG MSgt Charles F. Lewis

2 BMW, Barksdale Crew E-104: P Capt Hugh P. Dean, CP Capt David M. Conway, NN Capt Russell A. Wellbrock, BO SSgt Donald C. Maddox

7 BMW, Carswell Crew S-102: P Capt Wesley W. Forman Jr. CP Capt Joseph D. Shine, N Capt Lawrence R. Nordgaard, BO SSgt Daniel R. Rheaume

4018 CCTS, Carswell Crew IT-1: IP Capt Jon A. Bisher, IRN Capt Franklin H. Hagler Jr, IEW Capt Terry E. Heath, IG TSgt Michael T. Slemp

90 SMW, F E Warren Crew E-089: MCCC 1Lt Michael M. Miller, DMCCC 2Lt James J. McGrail, Jr

321 SMW, Grand Forks Crew E-132: MCCC 1Lt Scott E. Weaver, DMCCC 2Lt Marcus A. Livingston

341 SMW, Malmstrom Crew R-088: MCCC 1Lt Donnie L. Love, DMCCC 2Lt David F. Stewart

351 SMW, Whiteman Crew E-093: MCCC 1Lt Larry E. Shelton, DMCCC Lt Larry J. Colbert

390 SMW, Davis-Monthan Crew E-110: MCCC Capt Cecil L. Mims, DMCCC 2Lt Terry A. Bridges, MSAT A1C Richard L. Honeycutt, MFT SrA Raymond E. Gauding

416 BMW, Griffiss Crew E-14: P Capt John C. Ramm, CP 1Lt Andrew L. Kjeldgaard, RN Capt Michael B. Patton, NN Capt Guy W. Nicholls, NE 1Lt Michael W. Fitzgerald, AG A1C Kevin L. Kelley

416 BMW, Griffiss Crew E-112: P Capt Paul M. Wolf, CP 1Lt Robert K. McNeal, NN 1Lt David M. DiCarlo, BO SrA Daniel P. McGrath

509 BMW, Pease Crew E-20: P Capt Jack C. Lafoon, WSO Capt William A. Rauschenbach

509 BMW, Pease Crew R-113: P Capt James H. Issenman, CP Capt Dale C. Smith, N Capt Gerald M. Korey, BO Sgt David P. Deterra

410 BMW, K I Sawyer Crew S-11: P Capt James C. Berg, CP Capt Benjamin K. Whitmer, RN Capt Gary A Schoenike, N Capt Richard B. Wallace, EWO Capt Marc A. Bringman, G SrA Thomas R. Geary

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW SACR 127-2.*

*U.S. Government Printing Office
1979-665-046/8

UNIVERSITY OF FLORIDA
3 1262 09304 9848

HALL OF FAME

TACTICAL FLYING

OVER TWENTY-THREE YEARS

170 AREFG, McGuire (NJANG)	None

OVER TWENTY-ONE YEARS

171 AREFW, Greater Pittsburgh (PAANG)	Mar '58
157 AREFG, Pease (NHANG)	Jun '58
97 BMW, Blytheville	Aug '58

OVER TWENTY YEARS

940 AREFG, Mather (USAFR)	May '59
307 AREFG, Travis	Sep '59

OVER EIGHTEEN YEARS

151 AREFG, Salt Lake City (UTANG)	Feb '61
161 AREFG, Sky Harbor (AZANG)	Apr '61
126 AREFW, Chicago O'Hare (ILANG)	Apr '61
134 AREFG, McGhee Tyson (TNANG)	Aug '61

OVER SEVENTEEN YEARS

340 AREFG, Altus	Feb '62
96 BMW, Dyess	Aug '62
19 BMW, Robins	Aug '63

OVER FOURTEEN YEARS

160 AREFG, Rickenbacker (OHANG)	Dec '64
320 BMW, Mather	Jul '65

OVER THIRTEEN YEARS

452 AREFW, March (USAFR)	Sep '66

OVER TWELVE YEARS

92 BMW, Fairchild	Feb '67
55 SRW Offutt	Jul '67
2 BMW, Barksdale	Aug '67

OVER TEN YEARS

5 BMW, Minot	Feb '69
42 BMW, Loring	Sep '69

OVER NINE YEARS

141 AREFW, Fairchild (WAANG)	Oct '69
28 BMW, Ellsworth	May '70

OVER SEVEN YEARS

7 BMW, Carswell	Mar '72
101 AREFW, Bangor (MEANG)	Mar '72
416 BMW, Griffiss	May '72
305 AREFW, Grissom	Aug '72

OVER SIX YEARS

379 BMW, Wurtsmith	Apr '73

OVER FIVE YEARS

931 AREFG, Grissom	Feb '74
384 AREFW, McConnell	Mar '74
189 AREFG, Little Rock (ARANG)	May '74

OVER FOUR YEARS

43 SW, Andersen	Dec '74
68 BMW, Seymour Johnson	Sep '75

ICBM

OVER FIFTEEN YEARS

90 SMW, F E Warren	Jul '64
1 STRAD, Vandenberg	Sep '64

OVER FOURTEEN YEARS

308 SMW, Little Rock	Aug '65

OVER NINE YEARS

341 SMW, Malmstrom	Apr '70

OVER SIX YEARS

390 SMW, Davis-Monthan	Jul '73

OVER FOUR YEARS

351 SMW, Whiteman	Oct '74
91 SMW, Minot	Nov '74

To gain listing in the Hall of Fame, a SAC or ARF unit must be Class A mishap-free for 48 months.